CLAIMS:

1. A method of separating air into a nitrogen enriched fraction and an oxygen enriched fraction using a plurality of strands of hollow fibre separation membrane wound around a core, said method comprising applying a pressure difference across said hollow fibre separation membrane, wherein said pressure difference is ≤ 30 psi.

2. A method as claimed in claim 1, wherein said pressure difference is selected from the group consisting of: (i) ≤ 25 psi; (ii) ≤ 20 psi; (iii) ≤ 15 psi; (iv) ≤ 10 psi; (v) ≤ 5 psi and (vi) ≤ 1 psi.

3. A method as claimed in claim 1 or 2, wherein the bores of said strands of hollow fibre membrane are maintained at a pressure which is lower than the pressure outside of said strands.

4. A method as claimed in claim 1, 2 or 3, wherein at least some of said pressure difference is created by withdrawing air from the bores of said strands of hollow fibre separation membrane.

5. A method as claimed in claim 4, wherein the amount of pressure difference across said hollow fibre separation membrane caused by withdrawing air from the bores is selected from the group consisting of: i) 10-15 psi; (ii) 5-10 psi; (iii) ≤ 5 psi; and (iv) ≤ 1 psi.

6. A method as claimed in any preceding claim, comprising supplying pressurised air to the outer

surfaces of said strands of hollow fibre separation membrane to cause at least a portion of the pressure difference across said hollow fibre separation membrane.

7. A method as claimed in claim 6, wherein the amount of pressure difference across said hollow fibre separation membrane caused by supplying pressurised air to the membrane is selected from the group consisting of: i) 10-15 psi; (ii) 5-10 psi; (iii) ≤ 5 psi; and (iv) ≤ 1 psi.

8. A method as claimed in any preceding claim, comprising withdrawing permeate oxygen enriched air from the bores of said strands of hollow fibre membrane at a first rate; and withdrawing retentate nitrogen enriched air from around said strands of hollow fibre membrane at a second, lower, rate.

9. A method as claimed in any preceding claim, wherein said hollow fibre membrane is a composite material comprising a porous hollow fibre tube coated with a selective polymer.

10. A method as claimed in claim 9, wherein the external surface of the porous hollow fibre tube has been subjected to a modification technique so as to increase the number of pores in said external surface before it is coated with said selective polymer.

11. A method as claimed in claim 10, wherein the porous hollow fibre tube is manufactured from polyethersulfone polymer material.

12. A method as claimed in claim 11, wherein the structure of the polyethersulfone fibre tube is modified

by soaking said fibre tube in a solvent solution comprising acetone until the solution has penetrated into the pores of said fibre tube, displacing the solution from the pores with distilled water and then drying the fibre tube.

13. A method as claimed in any of claims 10-12, wherein the application of the modification technique to the fibre tube results in the fibre tube having up to twice as many pores in its structure than an unmodified fibre tube and a gas permeability up to twice that of the unmodified fibre tube.

14. A method as claimed in any of claims 10-13, wherein the application of the modification technique to the fibre tube improves the surface characteristics of the fibre tube so that the outer surface of the fibre tube is able to support a very thin, uniform, defect free layer of selective polymer material.

15. A method as claimed in any of claims 9-14, wherein the selective polymer comprises polydimethylsiloxane.

16. A method as claimed in any of claims 9-15, wherein the selective polymer coating has been subjected to a plasma treatment technique.

17. A method as claimed in claim 16, wherein the plasma treatment technique consists of placing the coated hollow fibre tubes between two electrodes in a chamber containing a plasma forming gas, such as nitrogen, oxygen, argon, helium or carbon dioxide, or mixtures thereof, applying a voltage difference between the electrodes to produce a high-frequency plasma discharge and subjecting the coated tubes to the plasma discharge.

18. A method as claimed in any preceding claim, comprising providing said strands of gas separation membrane in a gas separation module, wherein the rate of production and/or composition of the nitrogen enriched air is varied by controlling the pressure and/or flow rate of the nitrogen enriched air stream leaving said gas separation module.

19. A method as claimed in claim 18, wherein a vacuum pump or bleed valve controls said pressure and/or flow rate of the nitrogen enriched air stream.

20. A method as claimed in any preceding claim, comprising providing said strands of gas separation membrane in a gas separation module, wherein the rate of production and/or composition of the nitrogen enriched air is varied by controlling the pressure and/or flow rate of the oxygen enriched air stream leaving said gas separation module.

21. A method as claimed in claim 20, wherein a vacuum pump or bleed valve controls said pressure and/or flow rate of the oxygen enriched air stream.

22. A method as claimed in any preceding claim, comprising providing said strands of gas separation membrane in a gas separation module, wherein the rate of production and/or composition of the nitrogen enriched air is varied by controlling the pressure at which air is supplied into said gas separation module.

23. A method as claimed in claim 22, wherein a pump or bleed valve controls the pressure at which air is supplied into said gas separation module.

24. A method as claimed in any preceding claim, wherein said nitrogen enriched air comprises between 10% oxygen, 90% nitrogen and 12% oxygen, 88% nitrogen.

25. A method as claimed in any of claims 1 to 23, wherein said nitrogen enriched air comprises less than 10% oxygen.

26. A method as claimed in any of claims 1 to 23, wherein said nitrogen enriched air comprises 7% oxygen and 93% nitrogen.

27. A method of supplying nitrogen enriched air to a fuel tank comprising a method as claimed in any preceding claim.

28. A gas separation module for separating air into a nitrogen enriched fraction and an oxygen enriched fraction, said module comprising a plurality of strands of hollow fibre separation membrane wound around a core, wherein said hollow fibre separation membrane is configured to separate air into nitrogen and oxygen enriched fractions when a pressure difference of ≤ 30 psi is applied across said membrane.

29. A module as claimed in claim 28, wherein said hollow fibre separation membrane is a composite material comprising a porous hollow fibre tube coated with a selective polymer.

30. A method as claimed in claim 29, wherein the external surface of the porous hollow fibre tube has been subjected to a modification technique so as to

increase the number of pores in said external surface before it is coated with said selective polymer.

31. A gas separation module for separating air into a nitrogen enriched fraction and an oxygen enriched fraction, said module comprising a plurality of strands of composite hollow fibre separation membrane wound around a core, wherein said membrane comprises a porous hollow fibre tube coated with a selective polymer, and wherein the external surface of said porous fibre tube has been subjected to a modification technique so as to increase the number of pores in said external surface before it has been coated with said selective polymer.

32. A module as claimed in claim 31, wherein said hollow fibre separation membrane is configured to separate air into nitrogen and oxygen enriched fractions when a pressure difference of ≤ 30 psi is applied across said membrane.

33. A module as claimed in any of claims 28 to 30 or 32, wherein said pressure difference is selected from the group consisting of: (i) ≤ 25 psi; (ii) ≤ 20 psi; (iii) ≤ 15 psi; (iv) ≤ 10 psi; (v) ≤ 5 psi and (vi) ≤ 1 psi.

34. A module as claimed in any of claims 29-33, wherein the porous hollow fibre tube is manufactured from polyethersulfone polymer material.

35. A module as claimed in claim 34, wherein the structure of the polyethersulfone fibre tube has been modified by soaking said fibre tube in a solvent solution comprising acetone until the solution has

penetrated into the pores of said fibre tube, displacing the solution from the pores with distilled water and then drying the fibre tube.

36. A module as claimed in any of claims 30-35, wherein the application of the modification technique to the fibre tube has resulted in the fibre tube having up to twice as many pores in its structure as an unmodified fibre tube and a gas permeability up to twice that of the unmodified fibre tube.

37. A module as claimed in any of claims 30-35, wherein the application of the modification technique to the fibre tube has improved the surface characteristics of the fibre tube so that the outer surface of the fibre tube is able to support a very thin, uniform, defect free layer of selective polymer material.

38. A module as claimed in any of claims 29-32 or 34-37, wherein the selective polymer comprises polydimethylsiloxane.

39. A module as claimed in any of claims 29-38, wherein the selective polymer coating has been subjected to a plasma treatment technique.

40. A module as claimed in claim 39, wherein the plasma treatment technique consists of placing coated hollow fibre tubes between two electrodes in a chamber containing a plasma forming gas, such as nitrogen, oxygen, argon, helium or carbon dioxide, or mixtures thereof, applying a voltage difference between the electrodes to produce a high-frequency plasma discharge and subjecting the coated tubes to the plasma discharge.

41. A module as claimed in any of claims 28-40, wherein the module is manufactured from lightweight, pressure resistant materials, such as plastics, lightweight metals or combinations of plastic and metal materials.

42. An air separation system comprising an air separation module as claimed in any of claims 28-41, said system further comprising means to supply air to the module, means to allow oxygen enriched air to exit the module from one side of the membrane, and means to allow nitrogen enriched air to exit the module from another side of the membrane.

43. A system as claimed in claim 42, comprising means for varying the pressure and/or flow rate of the nitrogen enriched air stream leaving the gas separation module to vary the rate of production and/or composition of the nitrogen enriched air.

44. A system as claimed in claim 43, wherein a vacuum pump or bleed valve controls the pressure and/or flow rate of the nitrogen enriched air leaving the gas separation module.

45. A system as claimed in any of claims 42-44, comprising means for varying the pressure and/or flow rate of the oxygen enriched air stream leaving the gas separation module to vary the rate of production and/or composition of the nitrogen enriched air.

46. A system as claimed in claim 45, wherein a vacuum pump or bleed valve controls the pressure and/or flow rate of the oxygen enriched air stream leaving the gas separation module.

47. A system as claimed in any of claims 42-46, comprising means for varying the pressure at which air is supplied into the gas separation module to vary the rate of production and/or composition of the nitrogen enriched air leaving the module.

48. A system as claimed in claim 47, wherein a positive pressure pump or bleed valve controls the pressure at which air is supplied into the gas separation module.

49. A fuel system comprising a fuel tank and a system as claimed in any of claims 42-48 for supplying nitrogen enriched air to the fuel tank.

50. An atmosphere inerting system comprising a system as claimed in any of claims 42-48 in fluid communication with a space requiring an inert atmosphere.

51. A gas separation module comprising:

a plurality of strands of hollow fibre separation membrane;

means for releasing at a first rate permeate oxygen enriched air from the hollow cores of said strands of membrane to the outside of said module; and

means for releasing retentate nitrogen enriched air from the module at a second rate;

wherein said first rate is greater than said second rate.